

Detectability of Hot Earths Using the Doppler Method

Raman Narayan

(Email: raman@ucolick.org)

University of California, Santa Cruz, California

Many extra-solar planets have been detected, but none of them are rocky, terrestrial planets like Earth. In this paper, the detectability of a particular scenario is examined, where there exists a “hot Jupiter” with a 3-day orbital period and a “hot Earth” with a 1.4-day period. The existence of such a planetary system is predicted by theory, and gas giant planets with similar close orbits have already been detected. The Doppler method for exoplanet detection is simulated, using Monte Carlo methods. Measurement error is assumed to be 1 m/s, which should be attainable in the near future if intrinsic stellar radial velocity, or stellar jitter, becomes better understood. It is concluded that rocky cores of one to several Earth-masses should become detectable as velocity measurements become more precise. The overall scheme of observation times and the range of frequencies searched can affect detection, although in general neither makes a profound difference.

